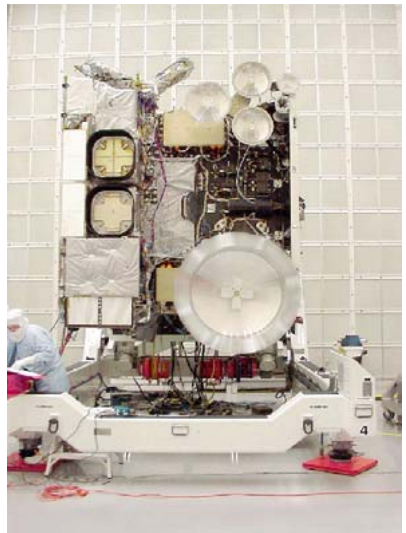
# Expected GOES N, O, P Performance

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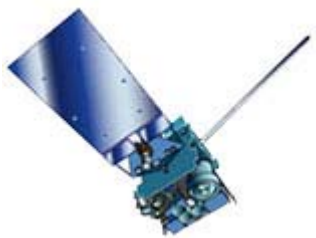
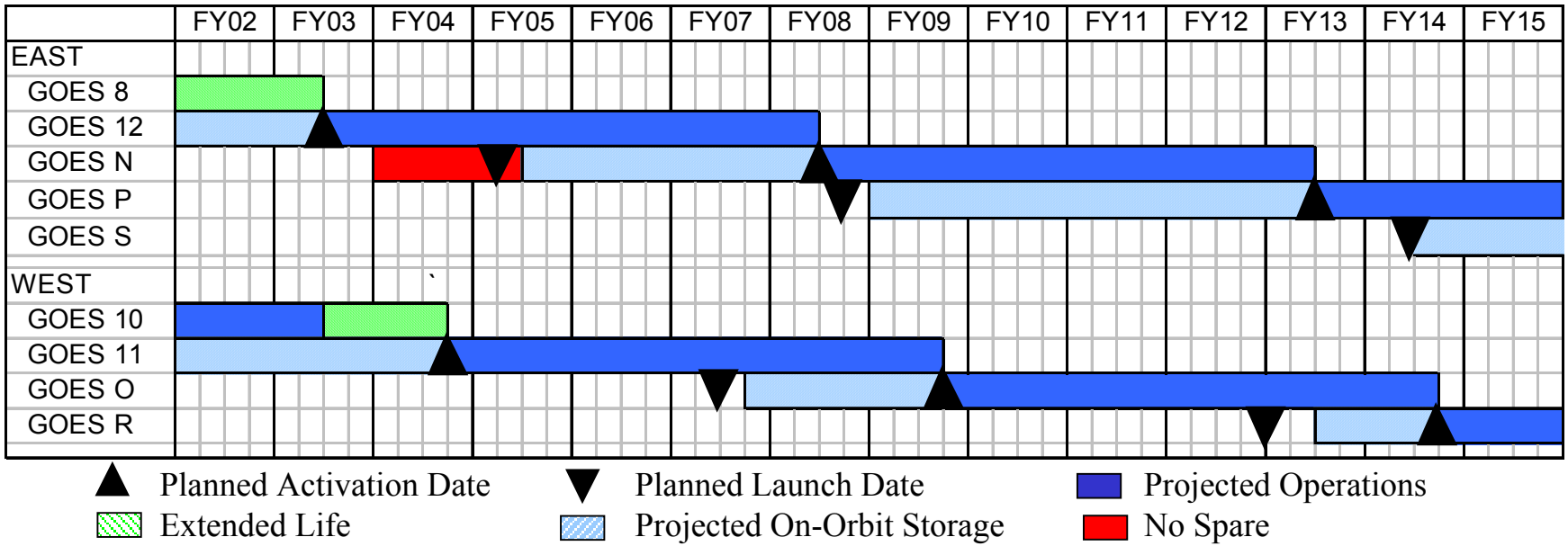
and many others

*December 2004*

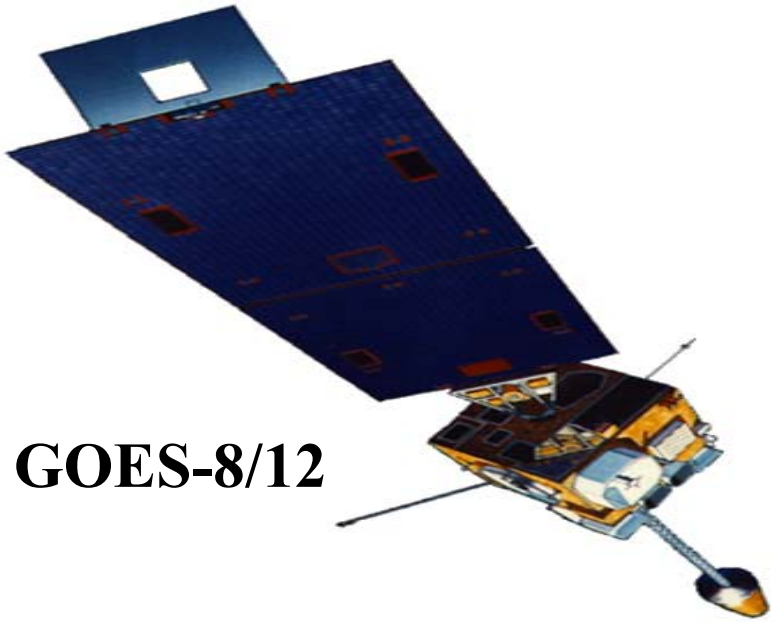
UW-Madison

# GOES Schedules



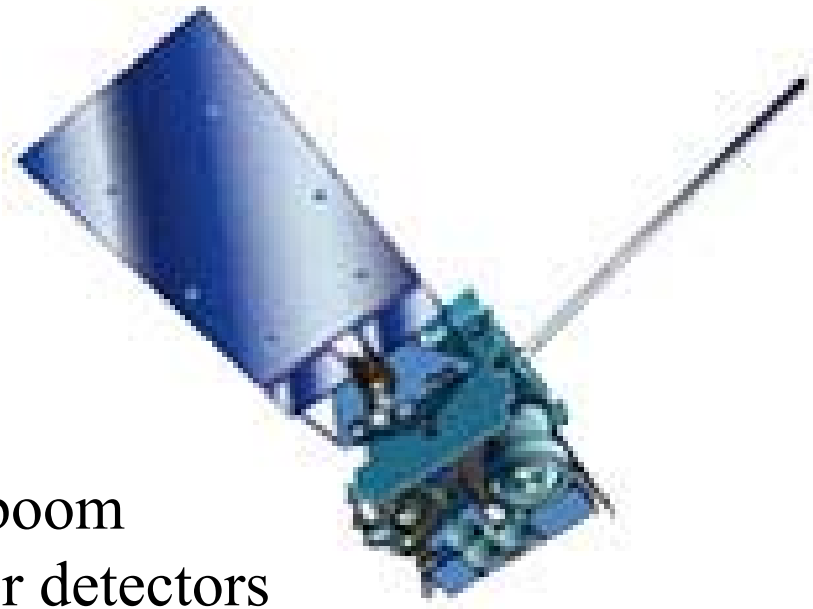

- GOES-N will not be launched before March 31, 2005 and operational in mid-2008.

- GOES-O is slated to be launched in 2007 and operational in late 2009.



**GOES-8/12**

GOES-N/O/P will have similar instruments to GOES-8-12, but will be on a different spacecraft bus. The new bus will allow improvements both to the navigation and registration, as well as the radiometrics.



**GOES-N/P**
Position of the boom allows for colder detectors

# Limitations of Current GOES Imagers

- Regional/Hemispheric scan conflicts
- Low spatial resolution
- Missing spectral bands
- Eclipse and related outages

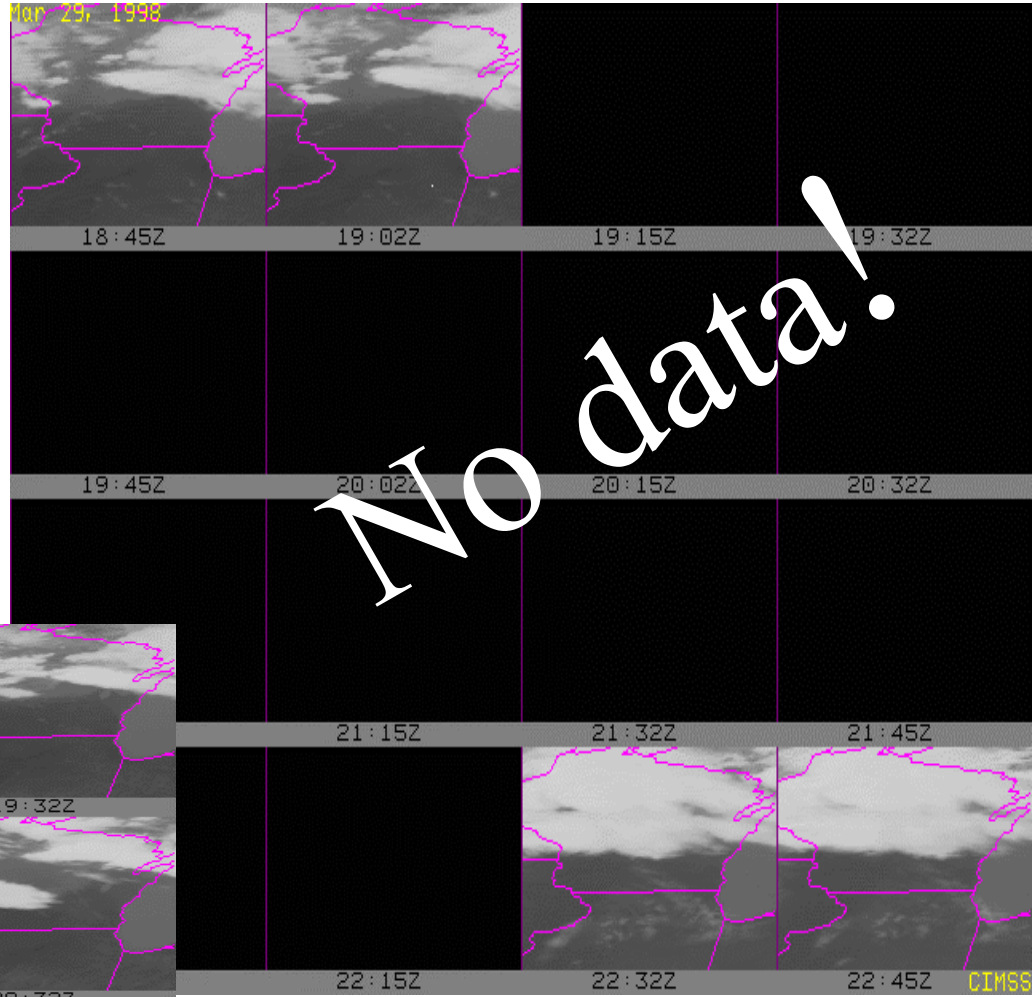
**GOES-N/O/P will supply data through the eclipse periods.** The spacecraft batteries are specified to be large enough to run through eclipse.

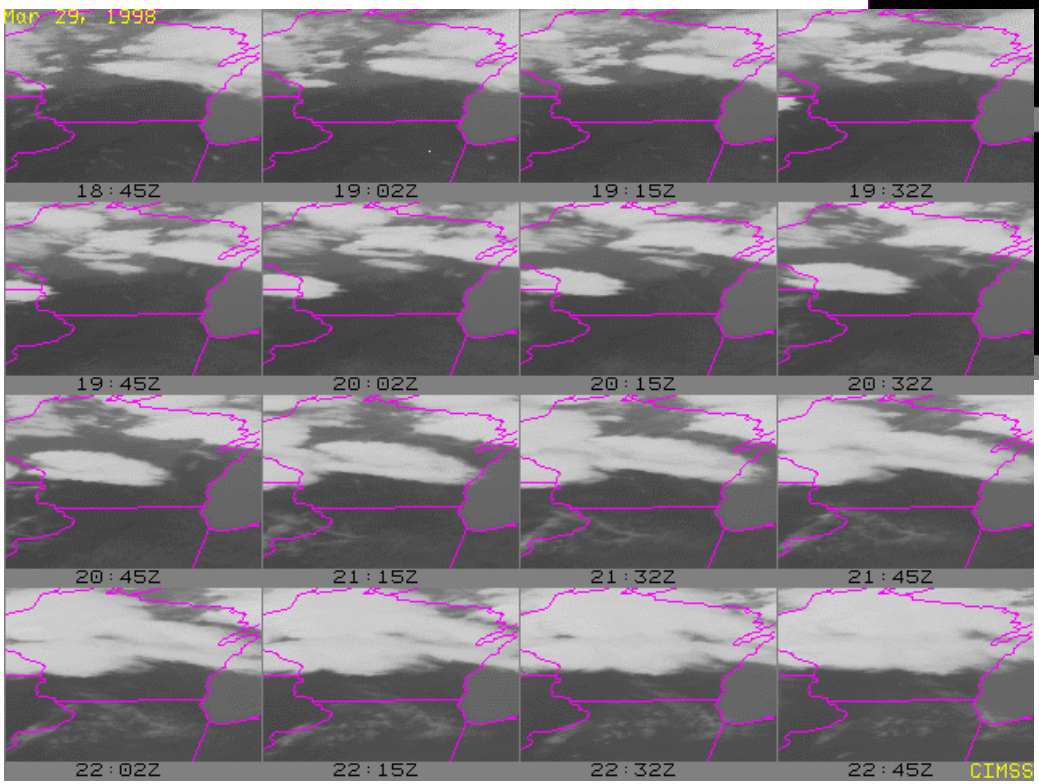
Shields have been added to the secondary mirror spiders. **Outages due to Keep Out Zones (KOZ) will be minimized.**

# Outages due to Eclipse and the Keep-Out-Zone

GOES-8

(~3 hours of data outage)

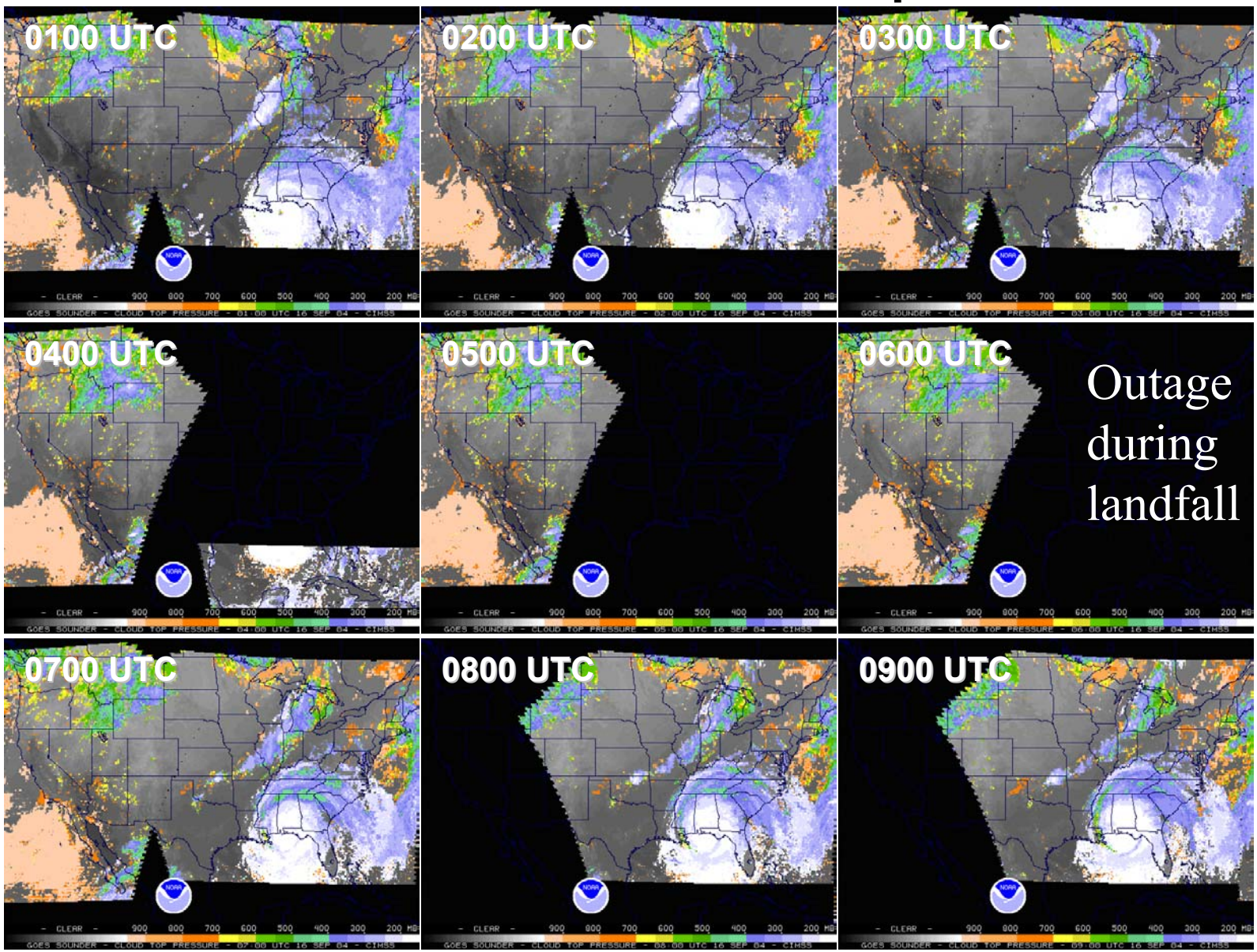



GOES-N+

(<<1 hour of data outage)

# The Onset Of Hurricane Ivan: 16 September 2004




GOES-10 & -12 Sounder Cloud Top Pressure Coverage

Improved **radiometrics** on GOES-N+

"The **GOES-N+ instruments will be less noisy. Lower patch temperature is the main driver**. Other modifications have been made to improve the noise performance on both instruments."

Imager: "For example, using channel 4 (10.5 micron channel) as the point of comparison, ground test data showed a patch low NEdT the GOES-N instrument (SN08) would be 0.05K. (The similar ground test value for the GOES-12 imager was 0.07K.)"

Sounder: "In general, The GOES-N LW and MW channels show NEN's that are about 2/3 of the GOES-12 ground test (Example: LW on GOES-12 ground test was 0.52mW/(m^2*Sr*cm^-1) compared to the 0.32 of the GOES-N instrument). SW channel NEN's will be about ¾ of the GOES-12."

Improved **calibration** on GOES-N+

“Potential reduction in striping to be achieved through increasing the Imager's scan-mirror's dwell time on the blackbody from 0.2 sec to 2 sec.

Analysis shows that the blackbody noise will be reduced by about 13% in Imager channels 3-5, which should improve the precision of their calibration by approximately that amount and also reduce the striping by an unknown amount (since there are a lot of other factors besides uncorrelated blackbody errors that cause the striping).

This improvement begins with GOES-N ”

Improved **navigation** on GOES-N+

- The GOES-N navigation will be improved
  - New spacecraft bus
  - Use of star trackers
- GOES-N performance will be verified on-orbit

GOES-I/M Performance & GOES-N Expected Performance

| Navigation at Nadir | GOES-I/M | GOES-N+ |
|---|---|---|
| Daytime (Visible) | 112 urad = 4 km | 53 urad (<2 km) |
| Nighttime (IR) | 168 urad = 6 km | 85 urad (~3 km) |

Improved **registration** on GOES-N+

- GOES-N Within-frame and Frame-frame registration will be improved.
- GOES-N performance will be verified on-orbit

GOES-I/M Spec & Expected GOES-N Performance

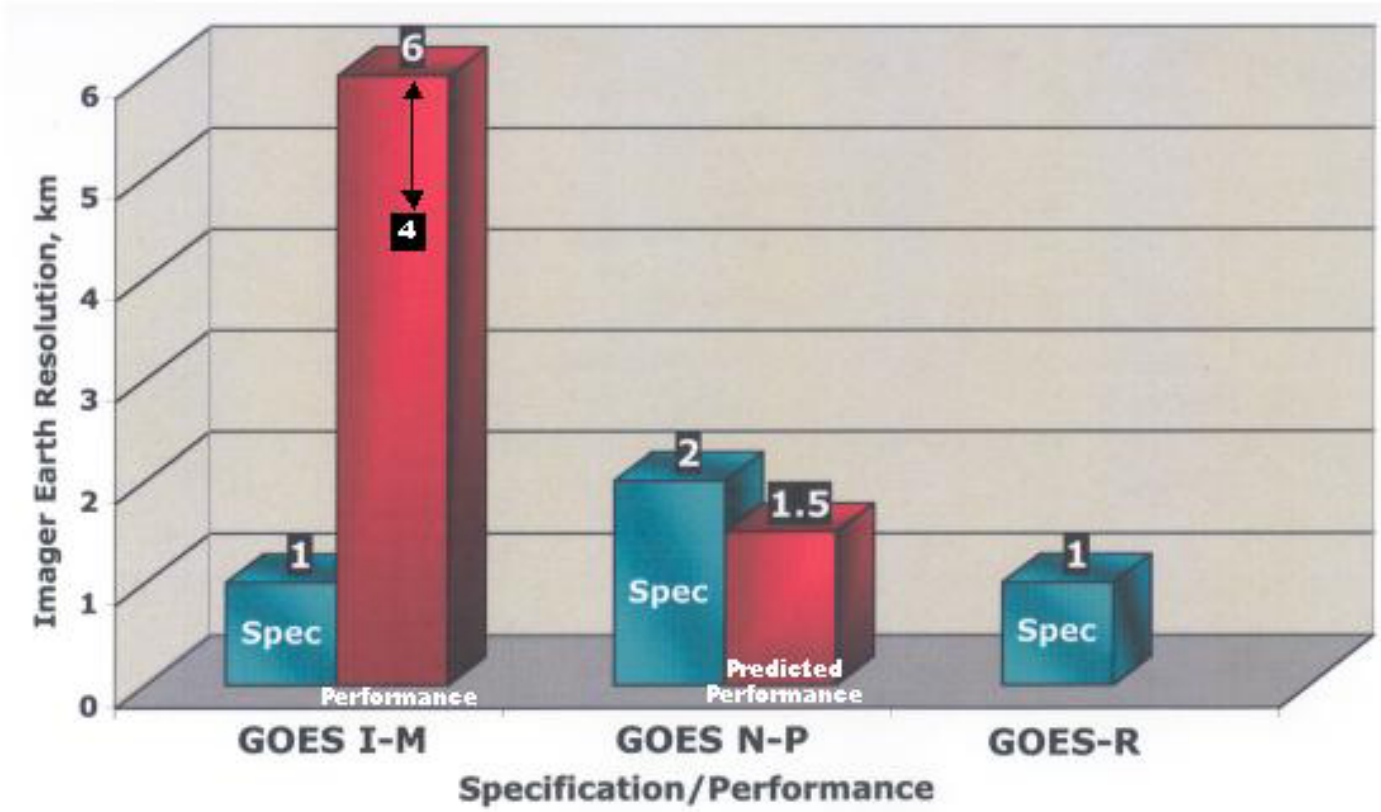
| **Registration** | **GOES-I/M** | **GOES-N+** |
|---|---|---|
| Within-frame | | |
| Inclin < 0.1° | 42 urad | -- |
| Inclin < 0.5° | 48 urad | ~50 urad |
| 15 min Fr-frame | | |
| Inclin < 0.1° (Vis/IR) | 42/70 urad | -- |
| Inclin < 0.5° (Vis/IR) | 48/80 urad | ~34 urad |

28 urad = 1 km

# Impact of Spacecraft Design on GEO METSAT Performance

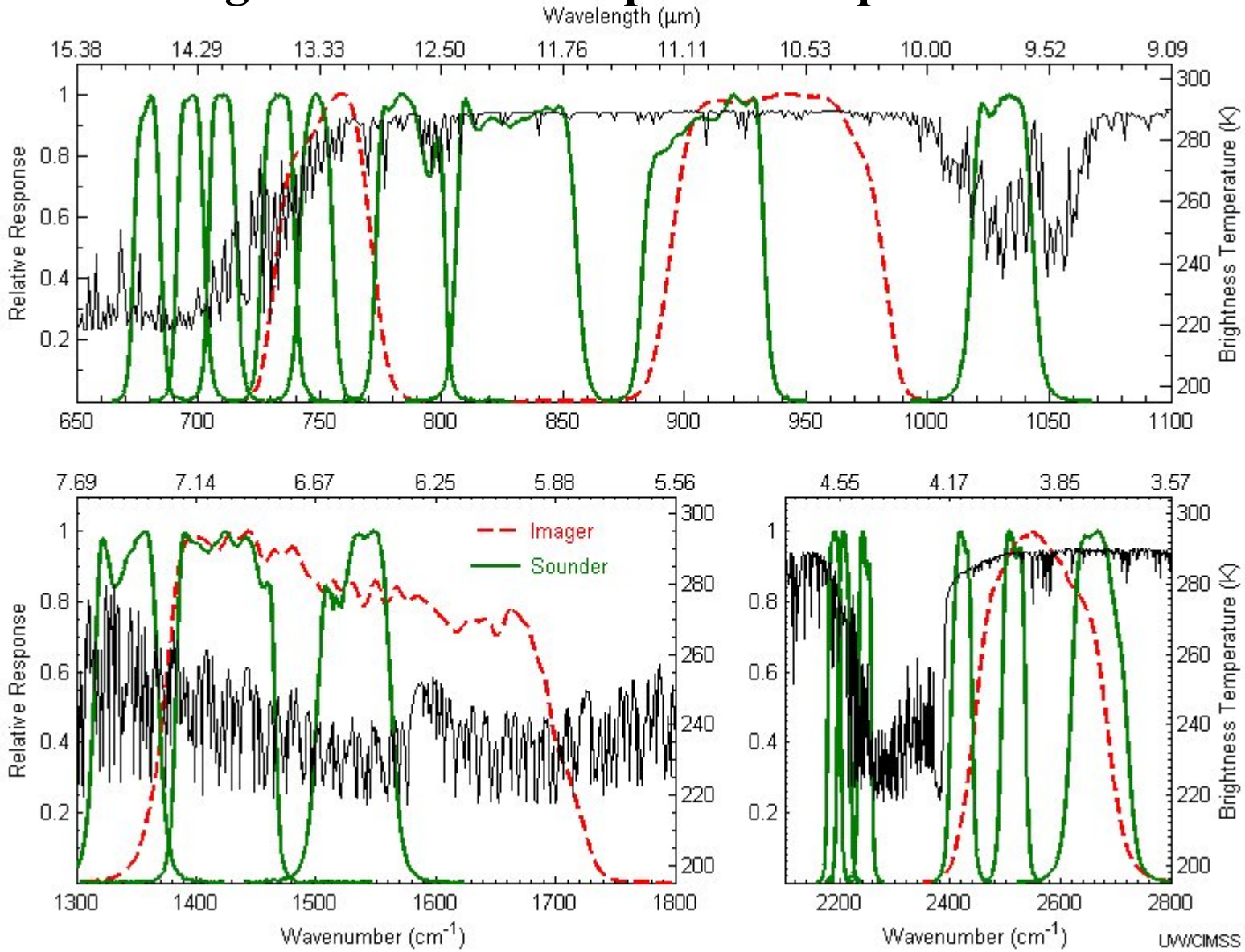
BOEING

***GEO weather satellite system performance is enhanced by bus capability. For NASA/NOAA the GOES N-P spacecraft technology advancements and performance enables greatly improved weather data***



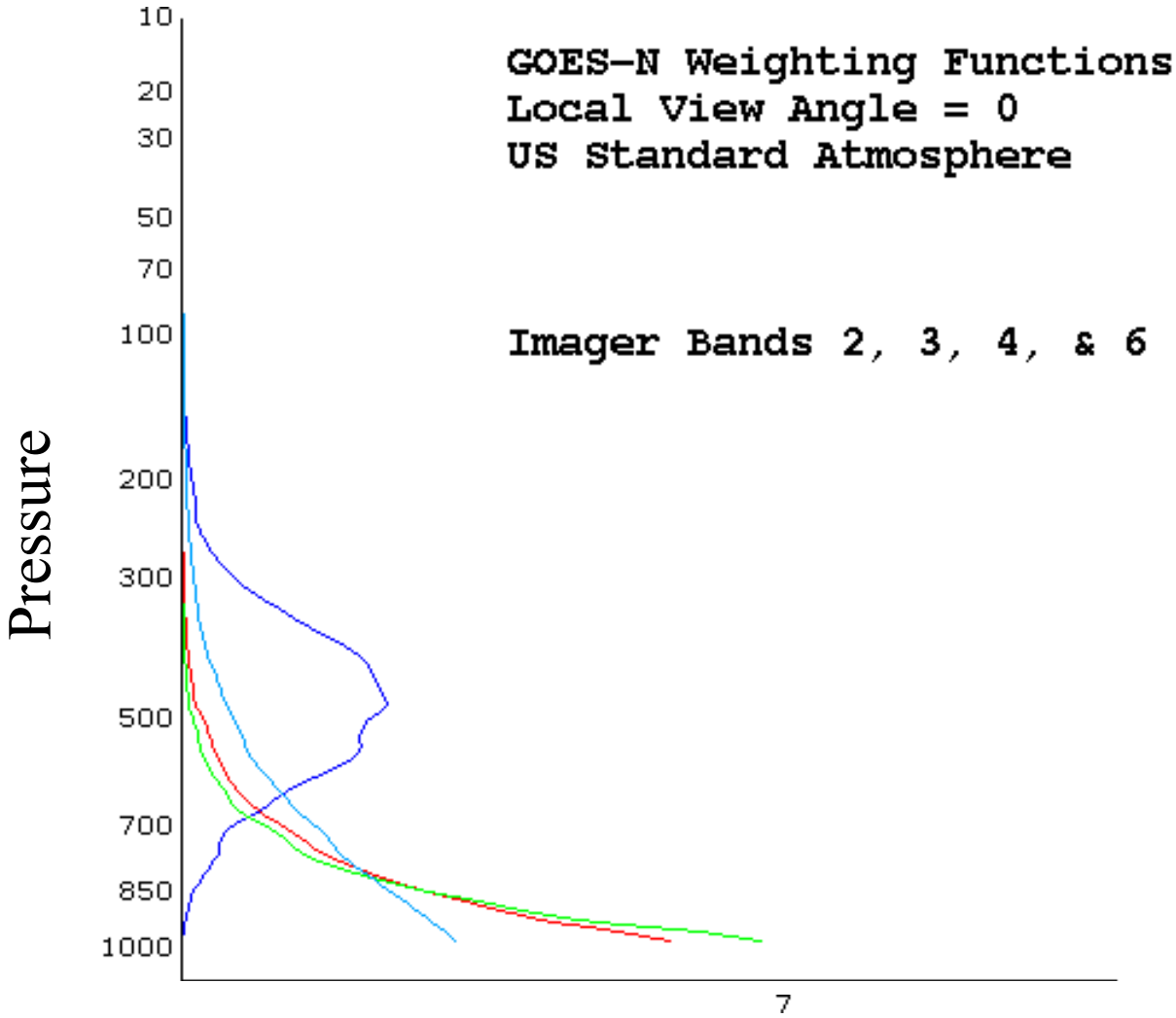

Slafer, Loren

# GOES-N Imager and Sounder spectral response functions.




GOES-N Imager and Sounder SRF were given to NCEP for OPTRAN

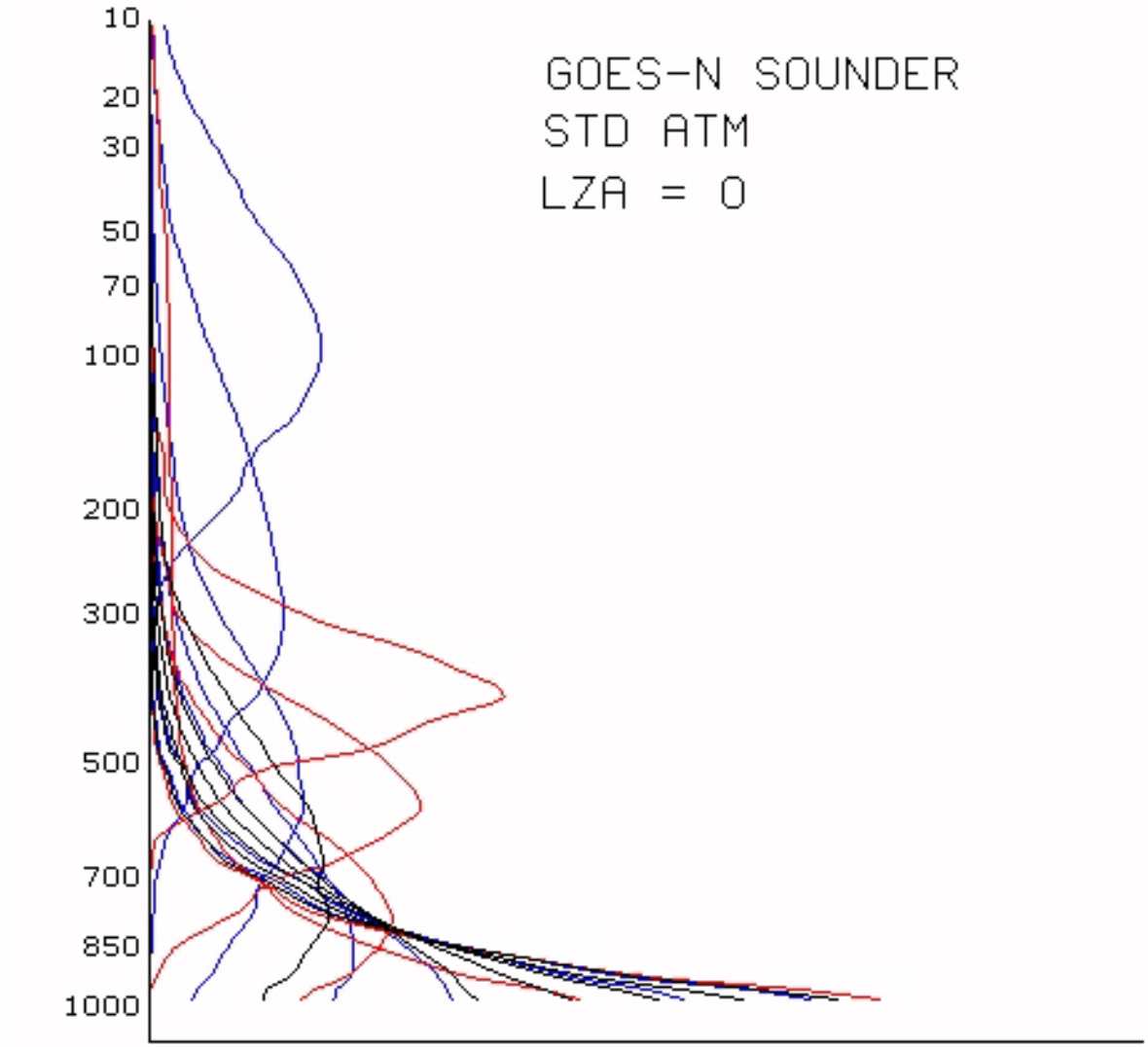
# GOES-N **Imager** Weighting Functions




These transmittance profiles were generated with PLOD/PFAAST forward model

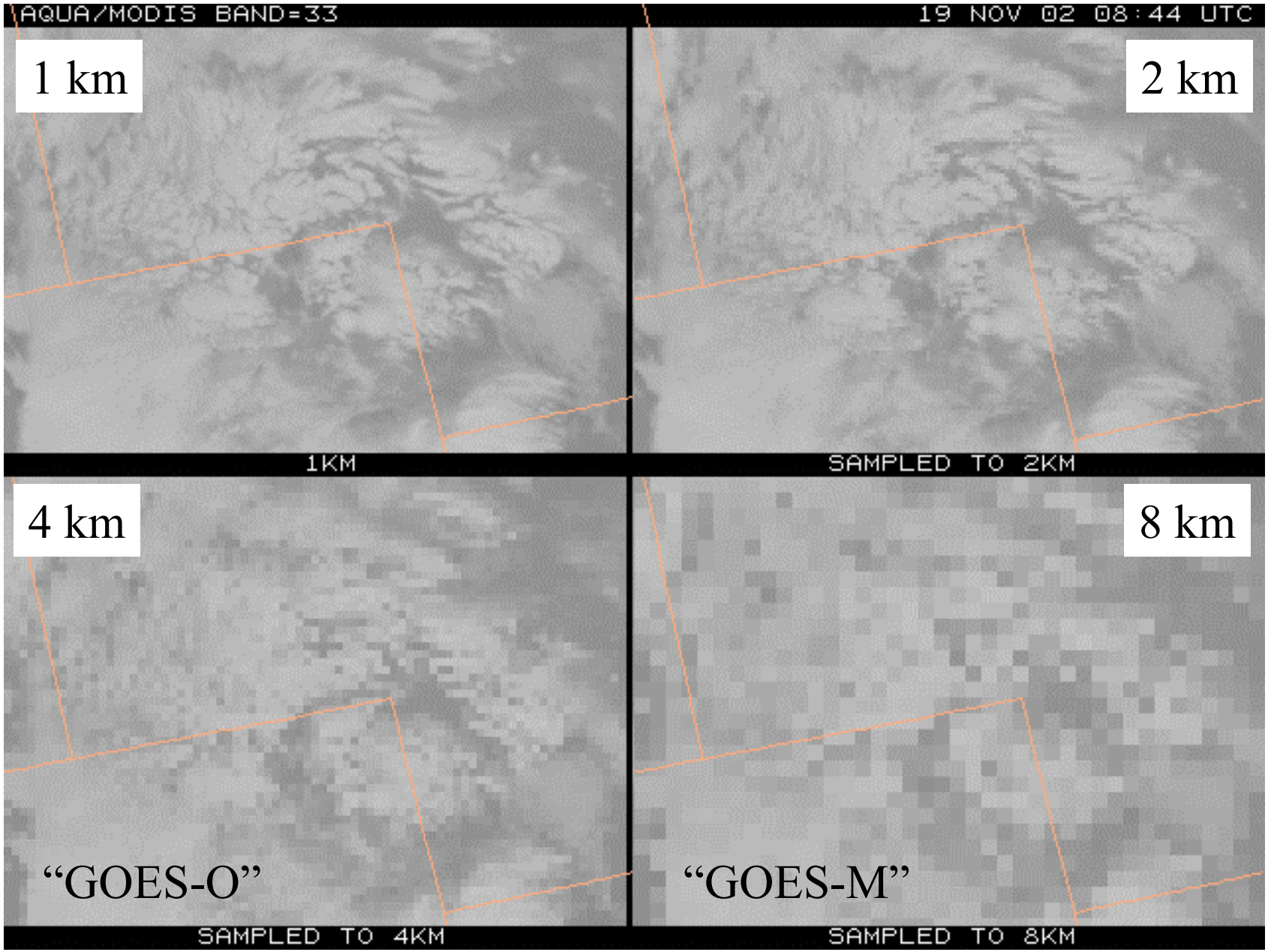
CIMSS

# GOES-N **Sounder** Weighting Functions




These transmittance profiles were generated with PLOD/PFAAST forward model

# GOES-O – improved spatial resolution of the 13.3 um band.



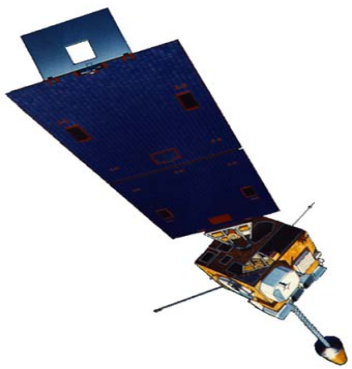
**Summary:**

**GOES-N/O instrument changes**

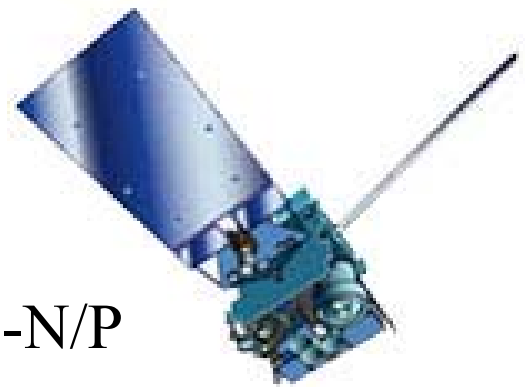
- **GOES-N post-launch check-out is upcoming**
- **better calibration (longer BB)**
- **Better resolution of the 13.3 um on GOES-O/P**

**GOES-N/O/P bus change**

- **no eclipse outages, reduced KOZ outages**
- **better calibration (colder detectors)**
- **better navigation (earth sensor -> star tracker)**



GOES-8/12



GOES-N/P

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